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NOTES ON RADCLIFFE'S SHARKS AND RAYS OF BEAUFORT

In his recent publication, The Sharks and Rays of Beaufort, North Carolina (Bull. U. S. Bur. Fish. XXXIV, Doc. No. 822), Mr. Lewis Radcliffe has given the student of these interesting forms an exceptionally fine piece of work, which adds greatly to our knowledge of them. By the many beautiful figures of dermal denticles and by the prominent position which he gives the use of the microscope as a means of identification, he has brought into the study of the Elasmobranchii added interest and greatly increased accuracy and it is to be regretted that in a work which will be so constantly before ichthyologists he has accepted in its entirety the nomenclature of Garman (The Plagiostoma, 1913) as this pretty surely contains features which will not stand. In my recent publication on *Mobula* I have used the name *olfersi* advisedly. Specimens of this fish which I sent to Paris have been compared by Dr. Jacques Pellegrin with the topotype of *olfersi* taken on the coast of Brazil in 1816 by Delalande and mentioned by Muller and Henle. He has found them to be the same species. Bancroft's description of *hypostoma,* I consider insufficient (following the opinion held by the late Dr. Theodore Gill).

Radcliffe refers to the small electric ray *Narcine* from Beaufort as *Narcine brasiliensis corallina* a subspecific name used by Garman for the Florida specimens apparently on account of their red color. I doubt the taxonomic value of this color difference, as specimens of *Aetobatis* which I have observed on the west coast of Florida had a reddish color, different from the clear black coloring of North Carolina specimens. At any rate Beaufort *Narcine,* which I have taken, have not been reddish.

The large electric ray *Tetronarce occidentalis* has been excluded from the Elasmobranchii of the North Carolina coast by Mr. Radcliffe as the records on which Dr. Smith included it in Fishes of North Carolina were indefinite. When preparing my paper on Sharks and Rays of Cape Lookout (Proc. Biol. Soc., Wash., 1915, page 89) I was of the same opinion, but recently I have taken two examples off Cape Lookout, which are now in the American Museum of Natural History, New York.

Referring to Radcliffe's note on the feeding habits of *Mobula olfersi* (page 280), I will say that like most of the Elasmobranchii they have very varied feeding habits, but I have often seen them feeding on "minnows," have caught them on hook baited with living "minnow" and have usually found in the many that I have examined that they contained "minnows" although occasionally I have found that they contained substances just as described by Mr. Radcliffe, and I saw the examination which he mentions as being made on July 10, 1913, on 9 examples [which I had caught the night before, July 9th] by Prof. W. P. Hay, and in fact opened several of their stomachs for this examination and discussed their unusual contents with Prof. Hay.

Careful measurements of a female *Mobula* are given on page 280 in which "both uteri were equally developed," a condition hard to explain, if this individual had ever had young. I have found the left uterus only functional in this species.

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ON HEPSETIA BONAPARTE, A FORGOTTEN GENUS OF ATHERINOID FISHES

The Fauna Italica of Bonaparte was issued in large sheets without date or pagination, the date usually assigned being 1836.

In this volume three new genera of Silversides (*Atherinidae*), are indicated: *Menidia, Membras* and *Hepsetia.* Of these, *Menidia* is defined, but without mention of type. Jordan and Gilbert assumed in 1883 that *Atherina menidia* L. was intended as the type species, a view which is doubtless correct. *Membras* is also indicated without type. Its definition contains nothing tangible. According to Aristotle, the μέμβρας or βέμβρας is a small fish of the shores of Greece, similar to the αφυη or *Aphya* (*Atherina hepsetus*), but not so good as food. This account may fit *Atherina mochon* Cuv. and Val, a small species also found in Greece, and is very likely the original μέμβρας. In want of other information we may take *Atherina mochon* as type of *Membras* in which case *Membras* becomes a synonym of *Atherina. Hepsetia* has been thus far overlooked. Its type is expressly stated to be *Atherina boyeri* Risso, while that of *Atherina* is *Atherina hepsetus* L. *Hepsetia* is defined as having rather strong teeth in the jaws, vomer and

palatines, the head small, the first dorsal over the ventrals. *Atherina* is defined by Bonaparte as having very minute teeth, a sharper head and the dorsal over the middle of the length of the pectorals.

As a matter of fact, there is no important difference in the position of the dorsal, which, in both species, is over the middle of the ventrals when depressed, and well behind the tip of the pectorals. *Atherina boyeri* has a shorter head, more oblique mouth and rather larger teeth. But in this no generic difference appears. *Hepsetia* like *Membras,* must be considered as a synonym of *Atherina.*

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AMBLYSTOMA TIGRINUM ON LONG ISLAND

Ova and Early Larval Development

Snow and frost prevailing throughout March, field work during the present year was not resumed until April 7th, observations again being made on the Hudson Estate near Syosset, L. I. The day was sunny, but not warm, with a strong north wind. Mr. R. Deckert, of the New York Zoological Park, accompanied the writer. In the woods there were still patches of snow and ice, and the pools, which had served as breeding places last year and had become dry in summer or fall, were now filled to overflowing, indeed, in some places formed ponds of considerable size and depth. Examination of the flooded regions in the woods soon showed that they contained very little aquatic life, aside from numerous fairy shrimps (*Branchippus vernalis*), a few insects, and occasionally a woodfrog (*Rana sylvatica*), or a green frog (*Rana clamata*). The spring chorus of wood frogs

and peepers (*Hyla pickeringi*) came entirely from ponds in adjoining meadows. One of these ponds, from which last season a number of *Amblystoma* larvae were obtained, again showed a profusion of life. One corner teemed with woodfrogs, many of them paired, while others had finished breeding to judge from the egg masses attached to twigs and branches just below the surface of the water. The more secretive peepers were oftener heard than seen. Cricket frogs (*Acris gryllus crepitans*) were also out, but not yet in song.

Though our hopes of finding adults of *A. tigrinum,* either breeding in the water or hiding on the land, were not realized, we did notice, at some distance from shore and barely visible at the depth of a foot or more below the wind-ruffled surface, several masses of jelly attached to the stalks of dead plants. Securing one by means of a long-handled landing net, and feeling sure that it represented an egg-mass of *A. tigrinum,* Mr. Deckert waded in and obtained ten more. He also observed many others in inaccessible parts of the pond.

The egg-masses are rounded oblong or kidney-shaped. The largest measures 3 x 2 inches, the average being about two-thirds of that size. The number of eggs is 30 in the smallest and 110 in the largest mass. Unlike the egg-masses of woodfrogs, which are composed of an aggregation of small, jelly spheres each enveloping an egg, the egg-masses of *A. trigrinum* represent one homogeneous mass of jelly, within which the eggs are distributed irregularly. The eggs measure 3 mm. in diameter, the animal pole being dark brown and the vegetative pole light buff. They are closely surrounded by a clear cell 4 mm. in diameter. I can see no obvious difference between the eggs of this salamander and those of *A. punctatum,* except that the egg-masses of the latter species average larger in size and usually contain considerably over 100 eggs.

Unfertilized ova, indicated by white, opaque eggs, amount to about 20%. While actual observations concerning the date of ovulation were not obtained, it seems safe to assume that this could not have taken place until the ponds were at least partially free from ice, which would fix the date not earlier than April 1st. Some of the egg-masses, judging from the advanced state of disintegration of the unfertilized ova, probably were deposited about that date, others, estimated on the same basis, were not over 2 or 3 days old. Workmen on the Hudson Estate had not come across any of the adult salamanders so far during the present season.

April 10th.—The ova of two out of four egg-masses kept in an aquarium at the laboratory have changed in form from spherical to arcuate, causing a proportionate enlargement of the clear cell surrounding them. The ova in the other two egg-masses are still spherical though somewhat enlarged.

April 18th.—Two larvae have hatched and are actively swimming about. Total length, 13 mm. Head very large, flattened. Eyes prominent, pupil black, iris speckled golden yellow. Gills and caudal membrane well developed. Yolk sack almost absorbed. Limbs not visible. Color, dorsally olive grey, speckled and irregularly blotched; ventrally pale buff. Magnification shows asteroid arrangement of pigment cells embedded in skin. Caudal membrane, extending dorsally to gill slits and ventrally to vent, is translucent, showing very faint pigmentation.

Developing embryos frequently turn or wriggle within the clear cells which attain a maximum diameter of 10 mm. and are filled with "watery fluid."

April 22d.—Twelve larvae have hatched. They are feeding on the very young nymphs of mayflies and dragonflies, introduced with aquatic plants.

The remaining egg-masses are showing signs of decomposition and have been thrown out. A lot of ova of *Rana sylvatica,* collected for the purpose of feeding the Amblystoma larvae with young tadpoles, also had to be discarded for the same reason.

Accepting April 1st as the earliest date of ovulation, the average hatching period would be 20 days—7 under natural conditions out of doors and 13 in the laboratory at an average air temperature of 65° F.

May 9th.—Field observations. Another breeding place has been located in the woods north of the Syosset Railroad Station. Shallow pools, formed by melting snow earlier in the season, contain many egg-masses. An adjacent pond, stocked with fish, has none.

On the Hudson Estate a lower water level of the pools revealed many more egg-masses than were seen in April. The meadow pool alone (surface area about half an acre) has close to 100. Quite a number of the egg-masses are still in the arcuate embryo state; others have hatched recently. Evidently ovulation has been continued since the visit, April 7. The young larvae are rarely seen swimming about, but remain on the bottom, well concealed in their perfect color harmony with the vegetation. The hatching period, under natural conditions out of doors, appears to vary between 30 and 40 days, subject to weather conditions.

The young larvae, hatched in aquarium April 18 to 22, now measure 18 mm. in length. Daphnia and other small aquatic life so far have served as food.

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THE NIGHT LIZARD OF THE MOJAVE DESERT (XANTUSIA VIGILIS) IN WINTER.

A specimen of *Xantusia vigilis,* the peculiar night lizard of the Mojave Desert, in California, was collected by the writer about 30 miles southeast of Daggett, on December 29, 1915. It was found by splitting open a Tree Yucca, which, though dead, was still standing. The lizard occupied a small cavity in the heart of the plant, and was fairly active when picked out, especially after having been warmed for a few minutes in the hands. The weather was cold, and a snow storm occurred on the following days, when continued search, both in fallen and standing Yuccas, failed to reveal further trace of *Xantusia,* with the single exception of a shed skin, which was also found in the heart of a standing Yucca. This brief note supplements those given by Dr. John Van Denburgh (Proc. Cal. Acad. Sci., V., June, 1897, p. 126).

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